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ABSTRACT

This document is a first year report on a project which examines the effectiveness of (1) teaching the mother versus teaching the infant, and (2) using a professional versus using a paraprofessional as the intervening agent. Also being studied is the relationship between the sex of the infant and the way he is taught and the effectiveness of systematic observation of teaching behavior on the behavior of the intervenor. The 3-year study began in March, 1970, with planning and the recruitment of 200 lower class mothers and their infants. Eight paraprofessionals and 8 graduate students were employed half-time to serve as parent educators. The entire study is to be completed by December, 1971, at which time data will be analyzed and included in a final report. In this report, specific hypotheses to be tested, the general study desgin and a plan for data collection are detailed. (MK)

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# INSTRUCTIONAL STRATEGIES IN INFANT STIMULATION

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## 1. Problem

Since September 1966, we have engaged in investigating an approach to early intervention into the lives of babies which might help break the poverty cycle. Our approach has been to use disadvantaged women to teach mothers how to stimulate their infants in their own homes. Our experience has led us to ask several questions concerning: (1) the actual teaching process, (2) the efficacy of the paraprofessional parent educator, (3) the effects on the mother, and (4) the problem of sex differences in infant performance. Further, current social pressure for group day care for infants raises practical questions regarding pertinent educational programs in such centers. The goals of this project are to examine in more detail (1) the ways in which instruction of infant and mother is carried out by paraprofessionals as contrasted with professionals, and (2) the relative effectiveness of working directly with the infant rather than teaching the mother. In addition, we propose to examine (1) whether instructional procedures of both paraprofessionals and professionals can be improved through systematic observation and feedback of their instructional behavior toward both infant and mother, and (2) whether mothers or teachers behave differently toward and have different educational expectations for male and female infants.

## 2. Related Research

Gordon (1969) reviewed the literature on family factors and found 25 relevant variables divided into three categories: Demographic, Parental Cognitive, Parental Emotional, which had been cited and empirically investigated as contributing to the differences between so-called advantaged and disadvantaged children. Generally, intervention research programs have not manipulated the variables under the heading of "demographic" factors listed in Table 1. Either these are too gross and complex to be manipulated, such as social class, or they represent economic factors beyond the scope of stimulation projects, or they are basically not subject to manipulation as an experimental variable, such as ethnicity. Table 2 indicates the attempts of seven research projects to deal with variables essentially in the "parental cognitive" group. Although Table 2 indicates that three projects (Boston, Illinois, Florida) have been concerned with the cognitive operational level and style of the parent, only the Florida project dealt with infancy and only the Illinois, Peabody, and Florida programs attempted to teach the mother how to teach her child. Table 3 indicates that measurement of the mother's cognitive behavior was attempted in only one project.

Hess and Shipman (1968) demonstrated that the cognitive elements in the mother's behavior in teaching her child three specific tasks in a laboratory setting was predictive of the child's performance on these tasks. They asked lower- and middle class-mothers, all Negro, to teach their children a box-sorting task, an etch-a-sketch task, and a toy-sorting task. The children were all four years of age. Typescripts of audio recordings were coded into the following categories: "informing, motivating, orienting, seeking physical feedback, seeking verbal feedback, positive reinforcement, negative reinforcement" (p. 70). In

Table 1

Family Factors Associated With Intellectual and Personality Behavior and Development

| Home Characteristic (home condition, parental behavior, parental belief or personality) | Investigators Indicating This Characteristic as Criterial | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bernstein | Bing | Bronfenbrenner | Coleman | Davis & Havighurst | Deutsch et.al. | Dyk & Witkin | Freeberg & Payne | Gordon, Bradshaw, Freijo | Hess & Shipman | Honzik | John & Goldstein | Kagan & Moss | Katkovsky et.al. | Lesser et.al. | Lynn & Sawrey | Marans & Lurie | Mischel | Moynihan | Pavenstedt et.al. | Rietz & Rietz | Roll | Sears et.al. | Smilansky | Strodbeck | Whiting & Child | Wolf, Dave, Garber | Wortis et.al. |
| **Demographic Factors** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Crowded homes | | | | | | X | | | X | | | | | | | | | | | | X | | | | | | X |
| 2. Ethnicity | | | | X | X | | | | X | | | | | | X | | | X | X | | | | | | | | |
| 3. Father present | | | X | | | X | | | | | X | | | | | X | | X | X | | | | | | | | |
| 4. Housing, quality | | | | | | X | | | | | | | | | | | | | | | | | | | | | |
| 5. Income | | | | | | | | | | | X | | | | | | | | | | | | | | | | X |
| 6. Social class | X | | | X | X | X | | | X | X | | X | X | | X | | X | X | | | | | X | | | | |
| **Parental Cognitive Factors** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. Academic guidance | | | | | | | | X | | | | | | | | | | | | | X | | | | | X | |
| 8. Cognitive operational level, style | | | | | | | X | | X | X | | | | | | | | | | X | | | | | | | |
| 9. Cultural activities planned | | | | | | X | | X | | | | | | | | | | | | | | | | | | X | |
| 10. Direct instruction of child | | | | | | | | X | | | | | | | | | | | | | X | | X | | | X | |
| 11. Educational aspirations | | X | | | X | X | | X | | | X | | | | | | | | | | | | X | | X | X | |
| 12. External resources (nurs., kg.) | | | | | | X | | X | | | | | | | | | | | | | X | | | | | | |
| 13. Intellectuality of home (books, etc.) | | X | | | | | | X | | | | | | | | | | | | | X | | | | | X | |
| 14. Verbal facility | X | X | | | X | | | X | | X | | X | | | | | X | | | | X | | | | | X | |
| 15. Verbal frequency (eg. dinner con. | | X | | | | X | | X | X | | | X | | | | | | | | | X | | | | | X | |
| **Parent Emotional Factors** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. Consistency of management | | | | | | | | | | | | | | | | | X | | | | X | X | | | | | X |
| 17. Differentiation of self | | | | | | | X | | | | | | | | | | | | | X | | | | | | | |
| 18. Disciplinary pattern | | | | | | | | X | X | | X | | | | | | | | | | | X | X | | X | | |
| 19. Emotional security, self-esteem | | | | | | | X | | X | | | | | | | | X | | | X | | | | | | | X |
| 20. Impulsivity | | | | | | | | | | | | | | | | | | | | X | | | | | | | |
| 21. Internal control, belief in | | | | X | | | | | X | | | | | | | | | | | | | | | X | | | |
| 22. Protectiveness, babying of child | | | | | X | | | | | | | | | X | X | | | | | | | | X | | | | |
| 23. Trusting attitude | | | | | | | | | | | | | | | | | | | | X | | | | | | | |
| 24. Willingness to devote time to child | | | | | | | | X | | | | | | | | | | | | | | | | | | | |
| 25. Work habits | | | | | | | | | | | | | | | | | | | | | X | | | | | X | |

Table 2

Program Goals in Relation to Changes in Home Characteristics

| Characteristics | Programs | | | | | | |
|---|---|---|---|---|---|---|---|
| | Boston | Peabody | Illinois | Howard | Syracuse | Florida | NYMH |
| Demographic Factors | | | | | | | |
| 1. Crowded homes | | | | | | | |
| 2. Ethnicity | | | | | | | |
| 3. Paternal role, behavior | X | | | | | | |
| 4. Housing, quality | | | | | | | |
| 5. Income | | | | | | | |
| 6. Social class | | | | | | | |
| Parental Cognitive Factors | | | | | | | |
| 7. Academic guidance | | | | | | | |
| 8. Cognitive operational level, style of p ., child | P,C[1] | C | P,C | | C | P,C | C |
| 9. Cultural activities planned | | X | X | X | | | |
| 10. Direct instruction of child | | X | X | X | | X | |
| 11. Educational aspirations | | | | | | | |
| 12. Type of resource provided | Nurs | Nurs,kg | | Nurs | Nurs | | |
| 13. Intellectuality of home (books, etc.) | | X | X | X | | X | |
| 14. Verbal facility of par., child | P,C | P,C | P,C | C | C | P,C | C |
| 15. Verbal frequency (eg. dinner con.) | | | X | | | X | |
| Parent Emotional Factors | | | | | | | |
| 16. Consistency of management | X | X | | | | X | |
| 17. Differentiation of self | X | | | | | | |
| 18. Disciplinary pattern | | X | | | | | |
| 19. Emotional security, self-esteem of par., ild | P,C | C | | | | P | |
| 20. Impulsivity | X | X | | | | | |
| 21. Internal control, belief in | | | | | | X | |
| 22. Protectiveness, babying of child | | | | | | X | |
| 23. Trusting attitude | X | | | X | | X | |
| 24. Willingness to devote time to child | | X | X | | | X | |
| 25. Work habits | | X | X | | | X | |

[1] P means parent change sought, C means child.

Table 3

Design Characteristics of University Programs

| Characteristics | Location | | | | | | |
|---|---|---|---|---|---|---|---|
| | Boston Univ. | Peabody College | Illinois Univ. | Howard Univ. | Syracuse Univ. | Florida Univ. | NIMH |
| Sample Families | | | | | | | |
| Negro | 3 | 43 | 30 | 38 | 20 | 145 | 30 |
| White | 10 | 0 | 0 | 0 | 39 | 30 | 0 |
| Locus of Program | | | | | | | |
| Home | | X | X | | | X | X |
| Center | X | X | | X | X | | |
| Roles of Parents | | | | | | | |
| Parent Educator | | | | | | X | |
| Develop Materials | | | X | | | X | |
| Volunteer | | | | X | | | |
| Teach Own Child | | X | X | | | X | |
| Observer, Recipient | X | | | | X | | X |
| Data Sources | | | | | | | |
| Tests | | | | | | | |
| Child Cognitive | X | X | X | X | X | X | |
| Child Affective | | X | | | | | |
| Parent Cognitive | | | | | | X | |
| Parent Affective | | | | | | X | |
| Other | | | | | | | |
| Systematic Observation | X | | | | | X | X |
| Parent Interview | | X | | | | | |
| Anecdotes | X | | | | X | | |

addition, they used three ratings of the transcript. Each mother was rated on the degree of specificity and the precision with which she directed her child and on whether or not she used design models (p. 76). They found that a mother who was low on these three measures would demand performance from a child without explaining why or relating it to a model.

For example, they report, "In some cases the mothers persisted in asking the child to produce labels for the blocks when the child did not know them, apparently working on the assumption that the child's failure to respond was due to inhibition or resistance rather than lack of information" (Hess et al., 1968, p. 103). Nevertheless, the child's performance was rewarded or punished although he was not quite sure what he was expected to do. The lower-class mothers differed from middle-class mothers in the amount of motivation they provided, in the amount of verbal feedback, and in the specific guidance given to the child. Although none of the seven programs on Table 2 examined these teaching variables as a part of their research design, we have some observational and anecdotal information that the parent educators with the Florida project sometimes resemble in their teaching behavior the lower-lower-class mothers described by Hess and Shipman; that is, they tell a child to perform, for example, "Hand me the red block." They are unable to handle failure by analyzing the elements of the problem and building small guiding and teaching steps to enable the child to succeed. They simply repeat the instructions. This raises the question of whether a lower-class parent educator, provided with the tasks and materials, can be an effective teacher for the mother if she lacks the cognitive styles required.

Hess and Shipman also distinguished three types of maternal control: "imperatives, internal subjective states, cognitive rational appeals." Schaefer (1965) proposed a three-dimensional model of maternal behavior: psychological autonomy versus psychological control, firm control versus lax control, rejection versus acceptance. Two of his dimensions, autonomy-control, acceptance-rejection, resemble the dimensions found by Soar (1968) in his analysis of classroom teachers' behavior. Baumrind (1967) investigated the same two dimensions in studying the effects of maternal behavior on preschool children's behavior. She found that ratings of home visits on the control-permissive and warm-hostile dimensions were highly related to maternal behavior in a structured teaching session. Further, the children reared by warm, controlling mothers were more likely to be assertive and self-reliant; those reared by warm permissive mothers were more likely to immature and avoidant. These findings echo Soar's results of the interactive effects of these two dimensions on pupil behavior. Infant intervention projects have not generally used systematic coded observation of teacher behavior. There has been a substantial body of work on systematic observation of teachers' classroom behavior, so that a number of techniques, mostly using closed systems of observation, have been developed with a high degree of reliability (Medley and Mitzel, 1963; Soar, 1968; Brown, 1968). In the cognitive realm, for example, the TPOR (Brown, 1968) was developed

to assess teacher behavior in relation to Dewey's theory of education. It provides a measure of the extent to which a teacher is open and experimental. (See Appendices E and F.)

Intervention projects generally have not had highly specified curricula. Hess and his associates held constant the task of the mother and the materials provided her to teach her four-year-old. This enabled them to observe and code behavior with setting (curriculum) held constant. We thus have procedures for observing teaching behavior, some concepts of the affective and cognitive dimensions to be observed, and the present lack of application to the observation of teaching a mother, or teaching an infant.

Neither the Baumrind nor the Hess studies used the observation of behavior as a technique for modifying the mother's behavior. The classroom observation schedules have been used as teaching tools. The Florida Parent Education project has developed a curriculum which makes it possible to examine the relative ability of different levels of trained people to implement the program and which provides the basis for systematic observation of teaching behavior. In addition, it provides a framework for testing the effects of information gathered on observation schedules of the behavior of the parent and infant educators.

There is also a limited knowledge of the effects of intervention programs on the attitudes and behavior of the mother. It may be noted in Tables 1 and 2 that the attempts to manipulate parental emotional factors or to measure these factors have been extremely limited. Data obtained on mothers have been of the social work observation type (Boston), parent interview (Peabody), or brief anecdotal descriptions of changes. In the present Florida project some beginning materials of mother self-concept, internal-external orientation, expectancy toward the child and actual language behavior are being gathered.

The role of mother as teacher has been reported by Smilansky (1968) as the key factor in the differences in ability to engage in socio-dramatic play of advantaged and disadvantaged Israeli kindergarteners. Table 1 indicates that direct instruction of the child, the planning of cultural activities, the utilization of external resources, and the intellectuality of the home all are factors in the child's intellectual and personality development. These are all related to the mother's concept of herself as teacher.

Laboratory studies have indicated sex differences in development during the first year of life (McCall and Kagan, 1967; Kagan, 1968) as well as differential treatment by adults (Gewirtz and Gewirtz, 1968). Our present research indicates that there is an interaction between training and sex in performance on the Griffiths Mental Development Scale at one year. (Scott and Lally, 1969.)

Bayley (1964) and Kagan and Moss (1962) have demonstrated that the way mothers behave toward their infant boys and girls relates to their later intellectual and social behavior. Hess and his colleagues report that on the basis of observed maternal teaching behavior, "achievement is stressed earlier and given greater importance in the socialization of male children than female children . . . Mothers of boys were more concerned with their sons' cooperation and achievement than were mothers of girls, and their affective responses to their sons were more closely tied to the sons' performance on the task than were the affective responses of mothers of girls: (Hess et al., 1968, p. 115). This seems contradictory to the position taken by Grier and Cobbs (1968) that the black mother depresses and deemphasizes the intellectual behavior of her son.

Bayley's analysis of some of the California growth study data suggests that correlations between vocalization in infancy and later intellectual performance shows some consistency for girls but not for boys. There seems to be no clear-cut theory as to why this should be so besides general notions of biological sex differences. Given our results and the differing viewpoint about maternal teaching behavior (Hess et al., versus Grier and Cobbs), an empirical question is whether the adults who deal with the infant behave differently and respond differently when attempting to teach a boy than when teaching a girl and whether they hold differing educational aspirations for them.

Most current field studies have manipulated either the professional-paraprofessional variable or the center-home variable and have not examined the actual instructional process with either infant or mother in a systematic fashion. For example, Caldwell's (1967) study of infants was conducted in a group setting using professionals with no attempt to teach mothers. Robinson[1] provided group care and education in an institutional setting through the use of professionals. Schaefer (1967) used college trained students as home visitors who taught the infant and young child in the presence of the mother but without either a specific set of teaching materials or manipulation of the teacher variable. Gray (1965) and her colleagues used both trained professional home visitors to work with older children in both nursery and home settings. Neither the Schaefer nor the Caldwell studies of infant stimulation has developed a "curriculum" specific enough to serve as a common base for the training of new personnel. The Gordon (1968) study, of which this is a proposed continuation, uses paraprofessionals as the intervening agent teaching an organized sequence of materials to the mother in the home. It lacks procedures for examining the way the mother is taught, and for comparing the parent education approach with

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[1]Personal visit of center, University of North Carolina.

direct teaching of the infant. In addition, no provision exists in any of the above projects for contrasting paraprofessional with professional as the intervening agent.

Systematic observations of the teaching behavior of the intervenor or the mother have not been made in the above intervention projects. Because of this, supervision for the improvement of instruction was based either on occasional observations (going along on a home visit, in our case) or in group discussions of problems. Yet, there is a substantial body of literature on observation of teacher behavior, and Hess and his associates (1968) have developed procedures for coding maternal teaching behavior. The latter, however, did not use these observations in a feedback loop to teach the mother to improve her style. Results from Caldwell, Gray, Schaefer, and Gordon all indicate growth in intellectual performance, but the variables are so gross that we now must examine with more precision just what is occurring and how particular productive factors might be enhanced.

This project will examine the relative effectiveness of (1) teaching the mother versus teaching the infant, and (2) using a professional versus using a paraprofessional as the intervening agent. Further, we will examine the relationship between the sex of the infant and the way he is taught, and the effectiveness of systematic observation of teaching behavior on the behavior of the intervenor.

## 3. Objectives

Specifically this project will attempt to answer such questions as: (a) Does an infant progress in intellectual and language development more rapidly when he is taught a sequence of activities directly than when his mother is taught these same tasks? (b) Is there a difference in the amount of progress shown by the infant when he is taught (either directly or indirectly) by the professional versus the paraprofessional? (c) Is there a difference in teaching style between a professional and a paraprofessional? (d) Do both the professionals and paraprofessionals exhibit differences in their teaching styles depending upon whether the infant is a male or a female? (3) Is there a difference between the professional versus the paraprofessional in the ability to utilize feedback on her performance? (f) Is there a difference in the amount of progress shown by a male versus a female infant under the various conditions of instruction? (g) Do mothers and teachers have differing educational expectancies for male infants versus female infants? (h) Does the mother change her role concept as a consequence of being taught?

The specific hypotheses to be tested are:

1. There will be no difference in intellectual and linguistic development as measured by the Bayley and by performance on the factors of the Stimulation Series Exercises, between infants who have received 9 months of stimulation directly from the professional or paraprofessional

worker and infants who have received this stimulation indirectly through the mother's learning of the techniques from the professional or paraprofessional worker.

II. (a) At the termination of the stimulation education program, no significant difference will be found to exist in the Bayley scores for infants taught (directly or indirectly) by professionals versus paraprofessionals. (b) At the termination of the stimulation education program, no significant difference will be found to exist on the factors of the Stimulation Series Exercises for infants taught (directly or indirectly) by professionals versus paraprofessionals.

III. At the beginning of the stimulation education program, there will be significant differences in teaching style, as measured by systematic observation techniques, between the professionals and paraprofessionals.

IV. At the beginning of the stimulation education program, both professionals and paraprofessionals will show significant differences in their teaching styles as measured by sustematic observation techniques depending on whether they are teaching a male or female infant.

V. No significant difference will be shown between the professional versus the paraprofessional on the ability to utilize feedback instruction to achieve gains in her teaching ability as measured by systematic observation of her teaching style.

VI. (a) At the termination of the stimulation education program, the female infants will exhibit significantly higher scores on the Bayley tests than the male infants, under all four conditions of instruction. (b) At the termination of the stimulation education program, the female infants will exhibit significantly higher performance on the factors of the Stimulation Series Exercises than the male infants, under all four conditions of instruction.

VII. (a) Teachers and mothers will both show significant differences in their educational expectancies for the male infants in the program versus the female infants in the program as measured by the Cognitive Home Environment Review at the beginning of the stimulation program for each child. (b) The magnitude of the difference in educational expectancies for male versus female infants in the program will increase over time and will be significantly greater at the end of the stimulation program than it was at the beginning.

VIII. The mother's concept of her role as measured by the Cognitive Home Environment Review, will change as a consequence of being taught stimulation tasks.

IX. (a) At the termination of the stimulation education program, mothers who were taught the stimulation procedures will show significantly greater skill in the administration of an appropriate task for a one-year-old than mothers whose infants were directly subjected to stimulation procedures. (b) At the termination of the stimulation education program, mothers whose infants were directly stimulated will

show significantly greater skill in the administration of an appropriate task for a one-year-old (as above) than mothers in the control group.

4. Procedures

a) General Design

Table 4 shows the factorial design being used in this project. Each teacher provides treatment to at least eight subjects which will produce an anticipated cell size of two after attrition. The advantage of this design is that differences among parent educators can be taken into account in the analysis. Main effects of professional versus paraprofessional, direct teaching of infant versus teaching of mother, and male versus female will be tested. In addition, interaction effects among these variables can be examined. The specifics are contained in the hypotheses stated above.

In order to implement this program, the first phase from March 1, 1970 to April 1, 1970 was for planning and recruiting of parent educators and graduate assistants. The second phase from April 1, 1970 to May 15, 1970 was for training the parent educators. There will be eight paraprofessionals and eight graduate students employed half-time to serve as parent educators. Our previous experience in training indicates that the equivalent of two full weeks will be needed for practice with the Stimulation Series material and understanding its use with mothers and infants. The additional equivalent of one week full time will be spent in understanding record keeping for home visit observation procedures, general administrative operations, and a general introduction to child and infant development. Recruitment of families will be started during the first phase and the intensive training period will terminate with a preliminary contact between parent educator and mother.

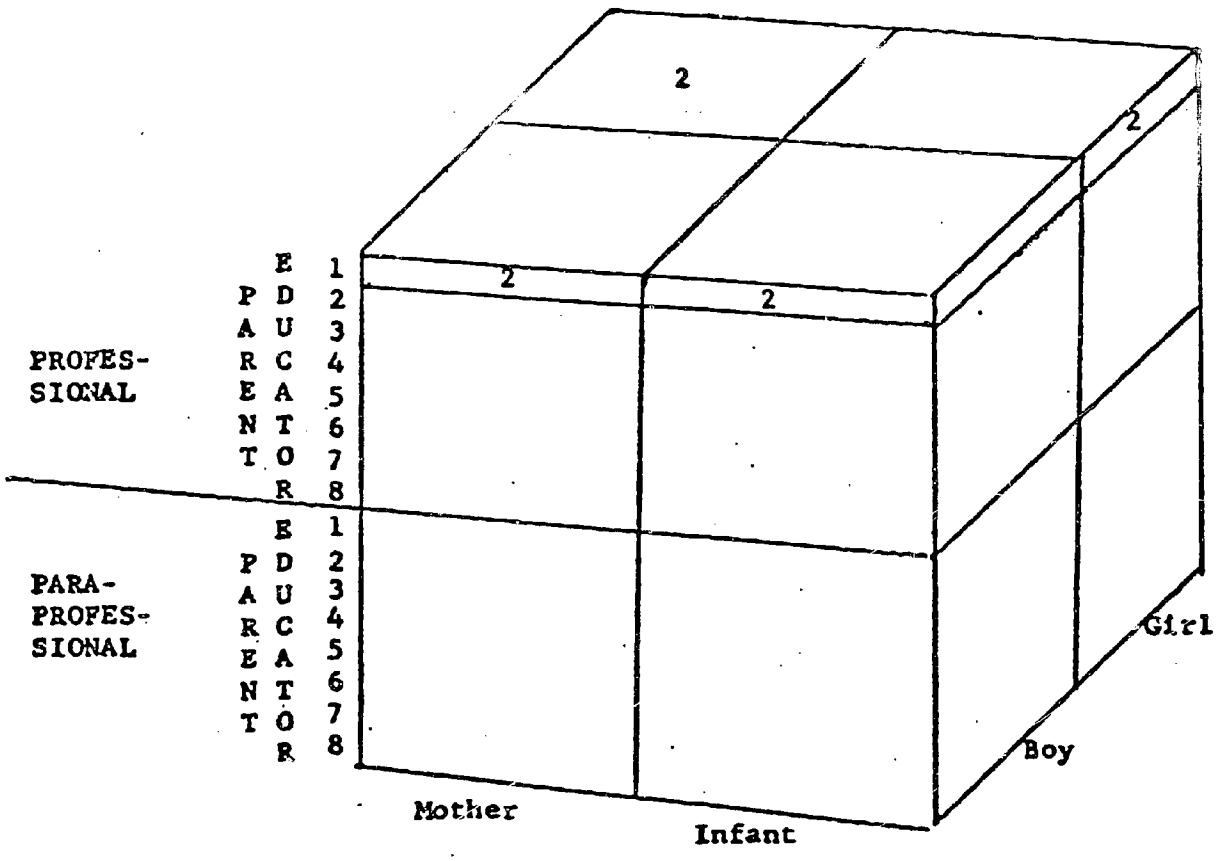
The beginning of actual stimulation began on May 16 and will last until the last baby reaches 12 months of age, on or about August 31, 1971. A center was instituted in the apartment building off campus which houses the project offices. Our effort is to keep the center a small intimate place designed for face-to-face individual instruction rather than a large institutional-type room. The main purpose of having a center is to allow for the video taping essential for testing hypotheses numbers III, IV, V, and IX.

The first stimulation session for mother or infant are held in the center, all of which is video taped. Thereafter, the sixth session for each child will be held at the center. The intervening sessions will be on a once-a-week home visit schedule. The last stimulation session at age one will also be at the center. This allows for eight tapes on each family.

Each session consists of presenting at least one task and working with the mother or infant until it is clear that interest is no

Table 4

Pictorial Representation of the Factorial Design



longer present or mastery is complete. At the first session a whole set of beginning exercises are presented so that the parent educator can get an estimate of where to begin. The pacing of progress is individual, and all activities in a particular series do not have to be finished before moving on. We keep records of each child's progress through the series.

Each video tape session is coded using an observation schedule which is used not only by research, but also as an inservice education material for the parent educator. Each parent educator works four half-days with families and attend inservice training one-half day a week. The major material in the inservice training is the video tapes and the coded observation forms. This constitutes the "feedback" mechanism by which we hope to modify both the task materials to we see the way they function in instruction, and the behavior of the parent educator in utilizing the tasks in instruction. Hypothesis number V refers to the relative ability of the paraprofessional and the professional to utilize this feedback system in monitoring their instructional behavior.

The video tape observation system represents a considerable strengthening of the present parent education efforts both in the area of increasing the capabilities of the parent educators and as a research device.

b. Sample

The sample of mothers and children consists of an original group of 200 mothers and their infants randomly assigned to four experimental conditions (mother taught by professional, infant taught by professional, mother taught by paraprofessional, infant taught by paraprofessional) and an equivalent overall control group. The sample is drawn from families living in Gainesville who might generally meet the classification of "poverty" families. However, income is difficult to determine in a program such as ours, so our guidelines are more flexible. The experimental and control groups probably include families above the Federal poverty level. In the previous projects, only babies who were born at the Teaching Hospital of the J. Hillis Miller Health Center of the University of Florida were involved. This required us to extend into twelve counties in order to collect a big enough sample. In this project, we use babies born at the Teaching Hospital, at Alachua General Hospital, or delivered by physicians at home.

Because of the estimated birth rate, it takes approximately six months to assemble a sufficient number of mothers and infants. The first baby born and admitted to the project was born about February 1, 1970. The last baby admitted will be born about August 15, 1971. The initial sample is 200 infants on the assumption that with attrition we will have a sample size of 128 experimental babies and 30 controls.

Mothers were visited either by parent educators or by a recruiter who was employed in a similar capacity in the Infant Stimulation and Home

Learning projects. The program is explained to the mother, the expected amount of involvement, and secures a written release for participation. In order for the child to be involved in the project the mother must understand that a once-a-week home visit by either professional or paraprofessional educator will be required that every sixth week the mother and infant must come to the Center for a stimulation session so that it may be video taped.

c. Data

Specific procedures for testing these hypotheses are discussed as follows in the same order as the hypotheses. Table 2 presents the data collection schedule.

Hypotheses I, II, and VI will be tested by using the Bayley and the Stimulation Series. The Bayley Scale is recognized as the best standardized measure of American infants. As shown in Table 5, this instrument will be administered at the end of the stimulation education program for the experimental group and at the same chronological age for members of the control group. Administration to a control group is included here as a simple means of replication of the findings for the previous Gordon study, where paraprofessional parent educators were employed to teach the mothers of infants, and as a positive control for the identification of the contribution to intellectual and linguistic growth attributable to the professional infant stimulators employed in the present investigation. In the same way the control group will provide a positive comparison for the contribution made to intellectual and linguistic growth by the paraprofessionals who work directly with the infants in their stimulation procedures.

As a product of the previous research, factors on the Stimulation Series Exercises were identified. The factos were: object concept (8 items), object permanence (7 items), anticipatory cues (8 items), linguistic (6 items). In the previous work, experimental and control babies were compared in percentage of success on each item. With the identification of factors, we will be able to compare on more psychologically meaningful dimensions with factor rather than item scores. Each baby will be scored on each of the above factors (Maurelli, 1969).

The Infant Stimulation Series will be administered to the infants in the experimental and control groups at the same chronological age as the Bayley. This will be the second measure of the differences expected between those infants stimulated (directly or indirectly) by a professional or a paraprofessional and their differences from unstimulated control infants.

Both the Bayley and the Stimulation Series Exercises will be administered at the center. Administration will be by trained graduate professionals not previously involved as stimulators in the project and who will not know which infant is in which group.

Table 5

Data Collection Plan

E = Collected from Experimental Group

C = Collected from Control Group

| Weeks of Infant Age | 13 | 19 | 25 | 31 | 37 | 43 | 49 | 52 |
|---|---|---|---|---|---|---|---|---|
| Bayley | | | | | | | | EC |
| Stimulation Series Factors | | | | | | | | EC |
| Mother's Role | EC | | | | | | | EC |
| Video | E | E | E | E | E | E | E | |
| Judgment of Video Teaching Style | E | E | E | E | E | E | E | |
| Judgment of Video Language Style | E | E | E | E | E | E | E | |
| Mother's Educational Expectancy for Her Child | EC | | | EC | | | | EC |
| Mother's Teaching Style (Video) | | | | | | | | EC |

The procedures for hypotheses III, IV, V, and IX are as follows: Teaching style will be measured through systematic observation of 15 minute video sample consisting of the professional or paraprofessional teacher's administration of a stimulation task directly to an infant or her teaching of the administration of the same stimulation task to a mother. The tasks used may be varied at different points in the chronological age of a child. The tasks are those appropriate for the age involved.

All video samples of teaching and language styles will be taken at the center rather than in the homes. The video technician on the job will be trained to get a standard video data sample: (1) from a standard angle and height of camera placement, (2) from a standard distance (3) under standard light conditions, (4) with a standard type of zoom focus defined to be as tightly focussed as possible on the two or three subjects involved without loss of pertinent paralinguistic or heuristic data for later interpretation, (5) with a standard placement of the microphone or microphones, and (6) with a standard high fidelity undistorted audio level for the clear collection of the form and content of the linguistic data.

The video tapes are scored by three professionally trained observer-judges working independently of each other and independent of the knowledge of the research hypotheses. To the extent that it cannot be inferred directly from the tapes themselves (e.g. the clothing of the infants or the cultural earmark of the teacher) the judges will not have information on the sex of the infant or whether the teacher is professional or paraprofessional.

Analysis of the teachers' language will be done from the same video tape instruction task and under the same conditions of lack of knowledge of the research hypotheses, the sex of the infants being taught, and the qualifications (professional or paraprofessional) of the teacher.

d. Analysis

The procedure for analysis will be a series of analyses of variance using as independent variables those dimensions outlined in A above. The independent variables for each analysis will be chosen to satisfy the specific hypotheses outlined in No. 3 above.

e. Time Schedule

March 1, 1970 -- April 1, 1970:

(1) Recruitment of parent educators.
(2) Recruitment of graduate assistants.
(3) Organize training curriculum.
(4) General planning.

April 1, 1970 -- May 15, 1970:
(1) Recruitment of sample.
(2) Training of educators.
(3) Training of coding team.

May 16, 1970 -- August 31, 1971:
(1) Intervention program.
(2) Collection of observation data.
(3) Collection of pre-post data scheduled in relation to children's birthdate.

September 1, 1971 -- December 31, 1971:
(1) Data analysis.
(2) Preparation of final report.

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Summary Progress Report, October 26, 1970

1. Objectives

a. Overall objectives

This project examines the relative effectiveness of (1) teaching the mother versus teaching the infant, and (2) using a professional versus using a paraprofessional as the intervening agent. Further, we are examining the relationship between the sex of the infant and the way he is taught, and the effectiveness of systematic observation of teaching behavior on the behavior of the intervenor.

We will attempt to answer such questions as: (a) Does an infant progress in intellectual and language development more rapidly when he is taught a sequence of activities directly than when his mother is taught these same tasks? (b) Is there a difference in the amount of progress shown by the infant when he is taught (either directly or indirectly) by the professional versus the paraprofessional? (c) Is there a difference in teaching style between a professional and a paraprofessional? (d) Do both the professionals and paraprofessionals exhibit differences in their teaching styles depending upon whether the infant is a male or a female? (e) Is there a difference between the professional versus the paraprofessional in the ability to utilize feedback on her performance? (f) Is there a difference in the amount of progress shown by a male versus a female infant under the various conditions of instruction? (g) Do mothers and teachers have differing educational expectancies for male infants versus female infants? (h) Does the mother change her role concept as a consequence of being taught?

In order to implement this program, the first phase from March 1-April 1, 1970 was for planning and recruiting of parent educators and graduate assistants. The second phase April 1-May 15, 1970 was for training the parent educators. There are eight paraprofessionals and eight graduate students employed half-time serving as parent educators.

b. Current goals

The goals for the current year are: (1) to complete the instructional program with mothers and infants (last baby will be one year of age about August 31, (2) to complete all video tapes on these instructional activities, (3) code and analyze all observations and home environment data, (4) test all babies on Bayley Scales and Stimulation series materials at first birthday, (5) analyze all data, and (6) write final report.

II. Studies conducted:

The first major research task was the development of appropriate observation schedules for the analysis of both home visit and video tape sessions, so that hypotheses derived from questions (c), (d), (e), (g) and (h) can be tested.

Four schedules were built. The adult-infant Reciprocal Categories System (RCS) was modified from the RCS (Ober, 1968) which was an adaptation of classroom interaction process analysis. In its present form, we can code either the adult-infant dyad or the parent educator-parent-infant triad. Three coders have

been trained, with reliabilities ranging from .85 to .93.

The Adult-Infant Interaction Schedule (A-IIS) was begun as a modification of the Hess-Shipman (1968) scale for measuring the mother's teaching style. However, we gradually abandoned this and developed a schedule which includes some of the same verbal items as the Parent Educator Weekly Report (PEWR), as well as some teacher behavior items. The A-IIS enables us to get frequency counts on maternal behavior that were found to relate to child performance in the earlier study (Gordon, 1969; Herman, 1970) when we had only the PEWR, a gross measure.

The third schedule is a modified PEWR, which includes items adapted from Schaefer's (1959) circumplex model of maternal behavior which he found related to child performance at ages two and three (Schaefer, 1969). This form is completed by the parent-educators at the end of each visit, including video tape sessions, and by the coders for the latter sessions.

The fourth schedule, filled out by the parent educators early after the family's entry into the project, and again at departure, is the Cognitive Home Environment Review (CHER). This is a modification of Weikart's (1969) and Garber's (1969) scales for assessing parental expectations and role. All four schedules are included as Appendix A.

Welch (1970) used the RCS to measure professional and paraprofessional teaching behavior at entry into the training program and at the completion of the six weeks and first contact with a project infant. He found no significant differences between the two groups at entry or end of training. There were several changes from pre to post. Both moved significantly on "amplifies," the professionals engaged in more "elicits" behavior, the paraprofessionals increased their "accepts" behavior. He did not analyze the infant contribution to the transaction, which will be done as we answer questions (c), (d), and (e). Welch's dissertation is Appendix B.

The present sample consists of the eight professional and eight paraprofessional Child Development Trainers, 104 families, 46 in which the mother is taught and 41 in which the child is directly taught, and 17 control families. To meet the design requirement of each child development trainer working with four mothers directly and four children directly (half boys and half girls), we will add 18 mother taught and 23 child taught families. 179 video tape sessions have been made, 95 babies examined and 632 home visits made.

Problems

Our problems have been logistical rather than technical. We have had to extend our geographical area because of a generally lower birth rate than we predicted. The time of year created problems in recruiting black graduate students as our professionals. We have had some scheduling and communication difficulties in connection with physical examinations. We have been able to solve these without any deleterious effects.

III. Significance of Studies

The development of observation schedules will increase the ability of infant

researchers, especially those concerned with assessing adult-infant interaction in a "teaching" rather than a "natural" setting, to gain reliable data which can be used across projects. This is a methodologically valuable contribution to the field because these schedules, since they already reflect other investigators' work, can provide researchers with some reliable assessment tools for measuring both process and product.

Welch's findings, if they hold up, contribute to our understanding of the issue of cultural difference in style, and also demonstrate that the use of video tape feedback can rapidly influence teaching behavior. As we test these out over the project, the findings will contribute both to theory and to methodology.

## IV. Research Goals

The goals this coming year are to test our original hypotheses which were derived from our objectives; specifically, to test whether professional or para-professionals differently, whether there are differences in the mothers and infants if mothers or infants are the target of instruction, and what role sex differences play in maternal behavior, expectancies, parent educator behavior and child performance.

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